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(51) INT CL⁷:
F16B 39/10

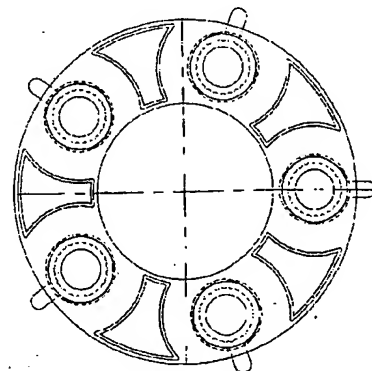
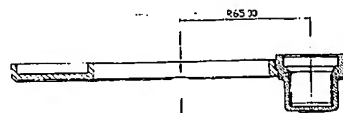
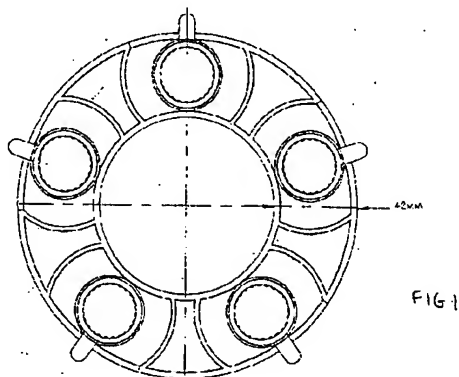
(52) UK CL (Edition W):
F2H HCP

(56) Documents Cited:
GB 2351134 A **GB 2325504 A**

(58) Field of Search:
UK CL (Edition W) F2H
INT CL⁷ B60B, F16B
Other: Online: WPI, EPODOC, JAPIO

(54) Abstract Title: **Wheel nut/bolt locking ring**

(57) A wheel nut/bolt locking ring comprises a ring member having a plurality of apertures. An insert for engaging a wheel nut/bolt is accommodated in each aperture. Each insert includes a tab member and, when the locking ring is installed on a wheel, is rotatable with respect to the ring member between a first position in which the tab member is hidden from view and a second position in which the tab member is visible.



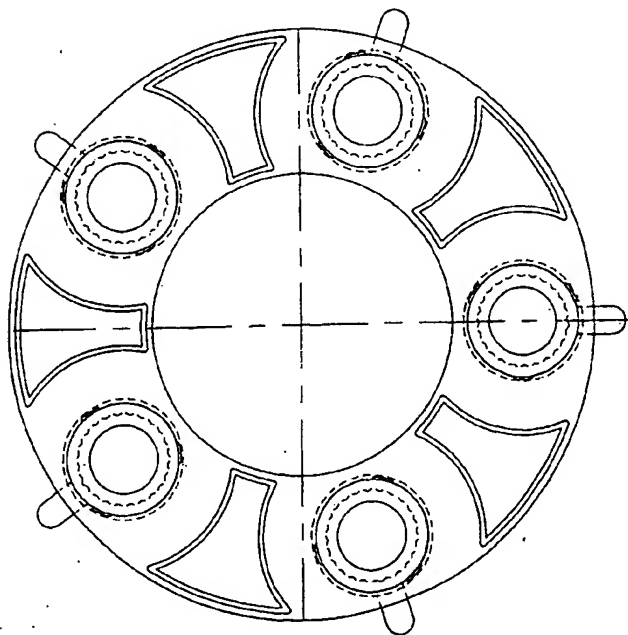
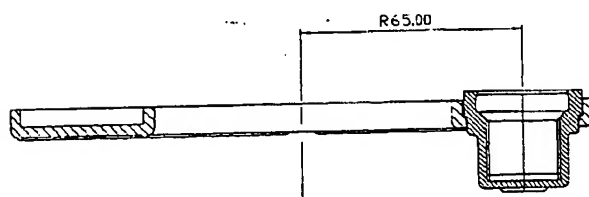
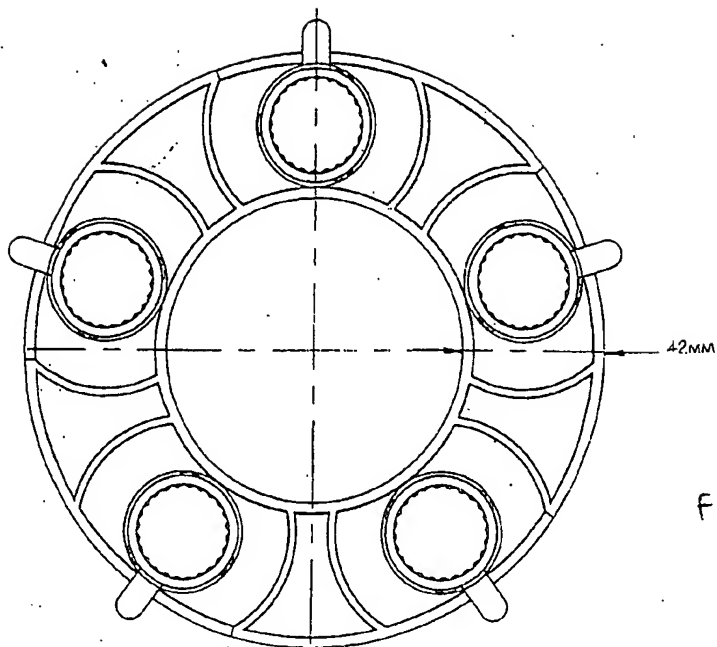
The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

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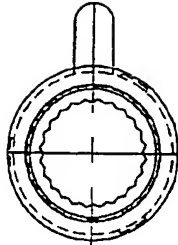
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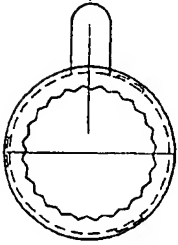


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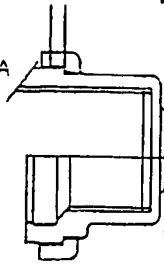
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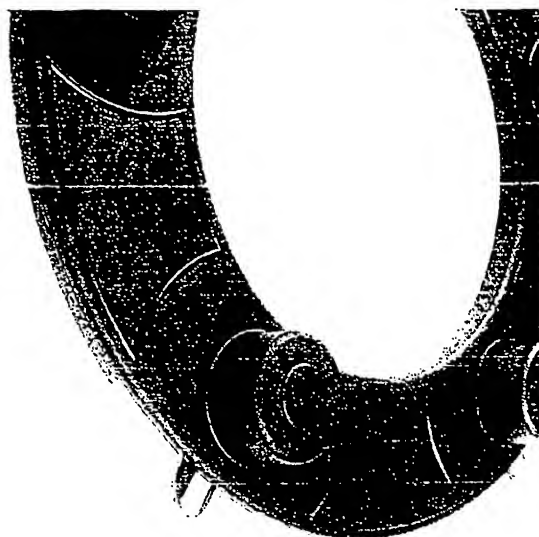


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FIG 2



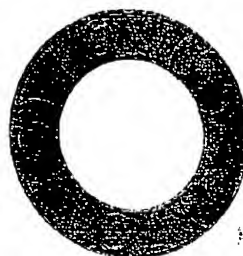
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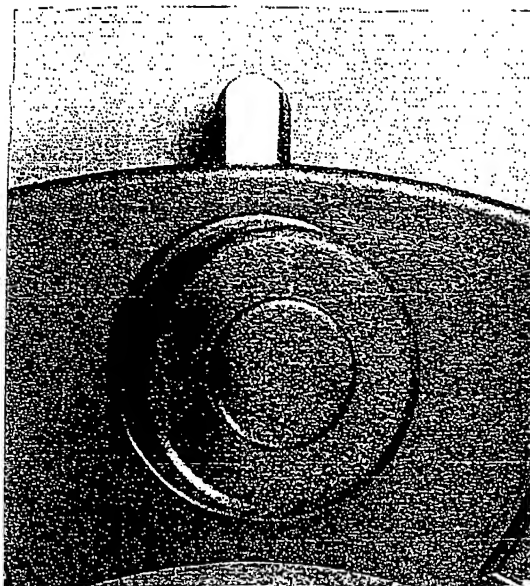
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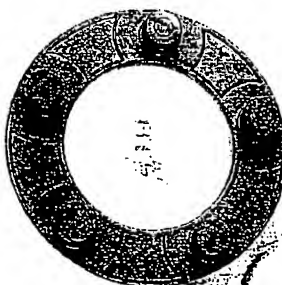
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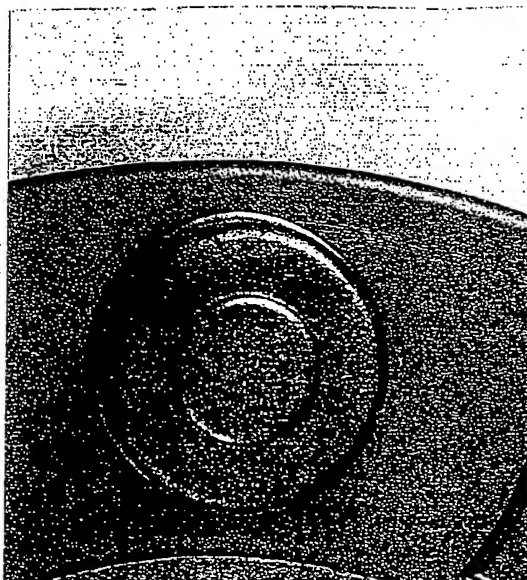
lock07.jpg



lock10.jpg



lock08.jpg



lock11.jpg

FIGURE 3

lock03.jpg

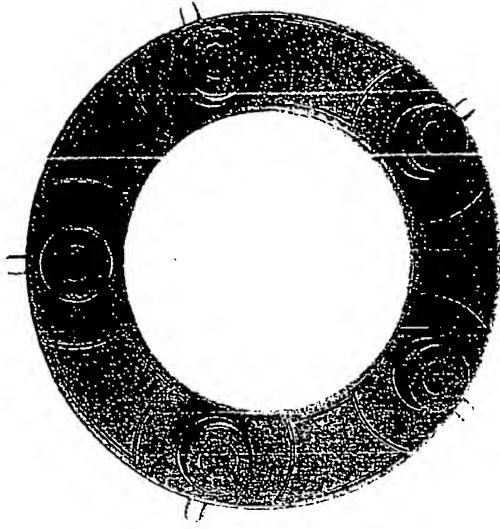
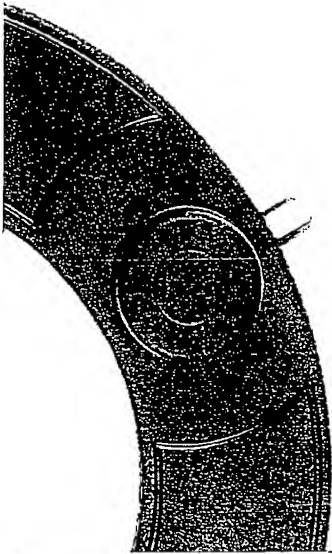
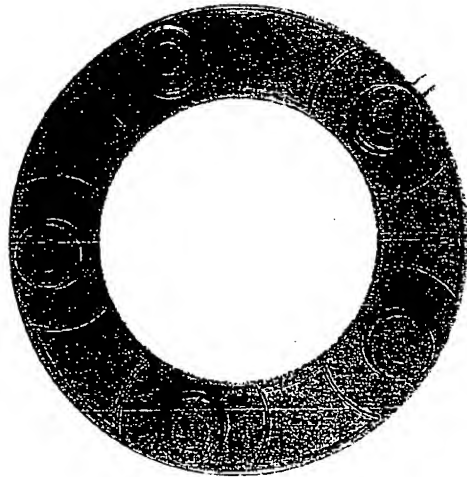


FIGURE 4

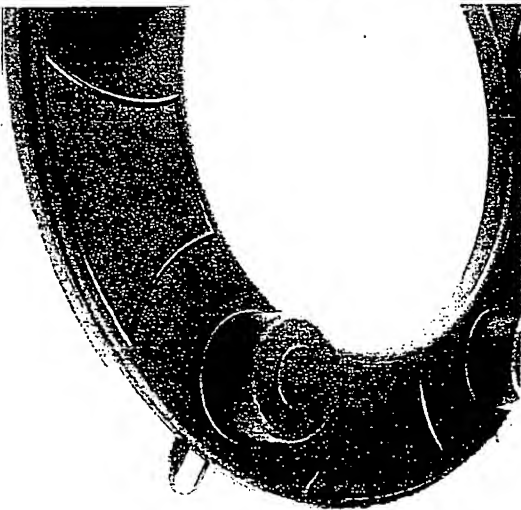
lock04.jpg



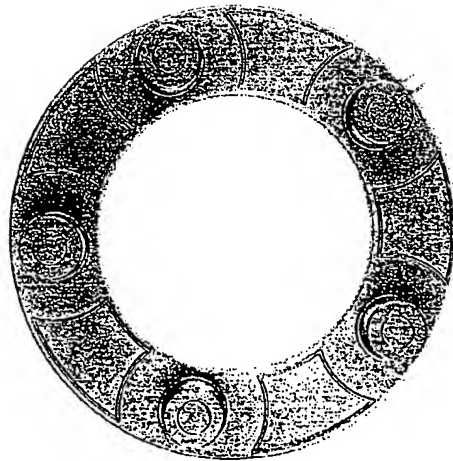
lock01.jpg



lock05.jpg



lock02.jpg



WHEEL NUT INDICATOR, AND RETENTION DEVICE

(Technical Field)

This invention relates to a device that visually indicates that a wheel nut has moved and is backing off, but then arrests any further movement thus locking the wheel nut in place. This invention is applicable to Light-Trucks, Vans, Light-Trailers and Caravans.

(Background)

Over the years it has been proven that most types of commercial vehicles, trailers and caravans have experienced problems with wheel nuts backing off, becoming loose and eventually coming off. The consequences of loose, or lost wheel nuts are several fold, they range from loss or difficulty to control the vehicle, damage to wheels and studs and ultimately if a WHEEL comes off, total loss of control, perhaps resulting in a serious accident even loss of life.

The invention described in this patent application is capable of solving this problem whilst encouraging good maintenance and inspection procedures.

(Essential Technical Features)

Within this invention we provide a simple, but very efficient mechanical device that performs the following functions when correctly fitted to a wheel. At this point it should be noted that this device known as Safety-Trim, as the name suggests this is a wheel trim, but with TWO unique safety features built into it, they are described below.

- 1) Once the Safety-Trim unit has been correctly fitted, any movement of all, or any of the wheel nuts will be clearly visually indicated. This indication is by way of a bright day-glow yellow marker that appears on the outside of the ring (wheel trim) when a wheel nut has moved. It is accepted practice for drivers of commercial vehicles to visually inspect the wheels and tyres of their vehicle each morning. The very best answer to a loose wheel nut is to re-torque it, the clear visual indication of any movement that Safety-Trim provides, offers this opportunity prior to damage, or an accident occurring.
- 2) The other safety feature built into the Safety-Trim unit is the ability to arrest any further movement of the wheel nut once it has visually indicated movement. This is a very important feature, by locking the wheel nut firmly in place it offers full back up, and peace of mind to both drivers, and operators in the matter of wheel loss resulting from loose or lost wheel nuts. The locking system is essential to offer a genuine safety solution, as previously stated we all accept that the best answer to a loose wheel nut is to re-torque it, however in practise this does not always happen.

In summing up, we believe that the Safety-Trim device offers the most effective answer to accidents and damage caused by wheels parting company with vehicles as a result of loose or lost wheel nuts.

(Example) A specific embodiment of the invention will now be described, later in this description; reference to accompanying drawings will be made.

Safety-Trim

Safety-Trim units are injection moulded using a specific grade of polypropylene to create the required strength and flexibility.

The units comprise of pre-formed polypropylene rings, the size of which suits the pitch centre diameters of the studs of various wheel sizes. Each of the rings has appropriately sized, and spaced holes designed to accommodate pre-formed polypropylene inserts which fit and locate onto the wheel nuts and form part of the visual indication and locking function. The size of the rings will vary dependant upon the size of the wheel, the number of holes in each ring will also vary, dependant on the size and design of the wheel.

The polypropylene inserts, snap fit into the rings allowing a specific amount of radial movement, the allowable radial movement is the key to the visual indication feature and also the ability to lock the nut in place. (The accompanying drawings clearly show how the indication and locking device work) The insert has the appearance of a little pot measuring approximately 33mm in diameter and 32mm deep. Each insert has a bright day glow yellow tab attached to the side, each tab measures approximately 16mm in length. Once snap fitted together the ring and the inserts become one and form the complete Safety-Trim unit. The complete units are located, and held in place on the wheel by snap fitting over the shoulder of the wheel nuts.

The inserts when located within the rings have a close, interference fit over the wheel nuts, the wheel nut CANNOT move within the insert. The inserts have within them splines, similar to a ring spanner that locate on the nut. The insert however, IS allowed a small amount of movement within the ring, and it is this allowable movement that reveals the day glow yellow tab that visually indicates that movement of the nut has occurred. When the insert has moved approximately one eighth of a turn, enough to fully reveal the indicator tab it locks, thus arresting any further movement of the wheel nut.

The unit has been designed to allow minimal movement of a nut backing off prior to locking. Some movement has to occur for the indicators to activate. We are confident however that a substantial amount of clamping action is maintained at this point.

Numbered references to the enclosed drawings and computer generated graphics

Fig 1. Line drawing showing Front, Back and sideways angles of polypropylene ring with the inserts in place clearly showing the inside of the inserts and the indication tabs. All illustrations show the indicator tabs revealed apart from the sideways angle.

Fig 2. Line drawing to scale of the inserts showing details of the inside, outside and the indicator tabs. Also in Fig 2. Is shown a sideways view of an assembled unit, as it would be seen off a wheel.

Fig 3. Computer graphics showing five different images of the assembled unit. Graphic No lock 05. jpg clearly shows the indicating and locking mechanism.

Fig 4. Computer graphics showing six illustrations, two close ups of the unit with, a) the wheel nut properly torqued and correctly in place and b) the wheel nut having moved and the indicator showing. The other illustrations show the various options available and also how corporate logo's could be built into the units.

Claims

- 1) "Safety-Link" and "Safety-Trim" will visually and clearly indicate any movement on a wheel nut; this movement should be noted and remedial action taken during daily inspection procedures.
- 2) "Safety-Link" and "Safety-Trim" will lock the wheel nut in place having first indicated movement, this is a unique feature, and one that is not found in any other product currently available.
- 3) "Safety-Trim" is also an attractive and decorative wheel-trim, which will enhance the appearance of the wheel and the vehicle; this is a major selling feature alongside the safety aspects.
- 4) "Safety-Trim" and "Safety-Link" Will also perform a vital role in save, but cost effective maintenance procedures, with the correct and controlled use of these products inspection time could be substantially reduced without compromise of safety and best practise recommendations.
- 5) "Safety-Link" and "Safety-Trim" could form the basis of safer and more cost effective fleet or single vehicle operations.



Application No: GB 0220039.2
Claims searched: 1 - 5

Examiner: Peter Macey
Date of search: 22 January 2004

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	GB 2351134 A (BUSINESS LINES)
A	-	GB 2325504 A (ROWLEDGE)

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	F Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^W:

F2H

Worldwide search of patent documents classified in the following areas of the IPC⁷:

F16B, B60B

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC, JAPIO